Unit -4 Matrices and Determinants

167	Find the value of $\begin{vmatrix} 1 & 1 & 1 \\ bc & ca & ab \\ \frac{1}{a} & \frac{1}{b} & \frac{1}{c} \end{vmatrix}$	02	M16
168	If A=$\begin{bmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{bmatrix}$ then prove that A^2	05	M16
169	Show that A=$\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ satisfy the equation $A^3-6A^2+9A-4I=0$	05	M16
170	If $A^{-1}=\begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & 4 \\ 1 & 1 & 3 \end{bmatrix}$, $B^{-1}=\begin{bmatrix} 0 & 0 & 1 \\ 1 & 2 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ then find $(A \cdot B)^{-1}$	05	M16
171	Solve the following system of equations using crammer's rule $ax + by - ab = 0$ $bx + ay - ab = 0$	05	M16
172	Solve the following system of equations using crammer's rule $x + 2y - z = 2$ $3x + 6y + z = 1$ $3x + 3y + 2z = 3$	05	M16
173	Define skew-symmetric matrix with illustration (2 times)	02	D15
174	A=$\begin{bmatrix} 1 & 2 & 0 \\ -1 & 3 & -5 \\ 2 & 0 & 4 \end{bmatrix}$ then find A^{-1}. Also verify that $A^{-1} \cdot A = I$	05	D15
175	If A=$\begin{bmatrix} 2 & -3 & -5 \\ -1 & 4 & 5 \\ 1 & -3 & -4 \end{bmatrix}$, B = $\begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & -5 \\ -1 & 3 & 5 \end{bmatrix}$, C = $\begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ then Prove that i) $A \cdot B = B \cdot A = 0$ ii) $A \cdot C = A$ iii) $C \cdot A = C$	05	D15
176	If $A^{-1}=\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 6 & -3 & 0 \end{bmatrix}$, $B^{-1}=\begin{bmatrix} 6 & 3 & 1 \\ 2 & 4 & -8 \\ 3 & -6 & 1 \end{bmatrix}$ then find $(B \cdot A)^{-1}$	05	D15
177	Solve the following system of equations using crammer's rule $x + 6y = 2xy$ $3x + 2y = 2xy$	05	D15
178	Solve the following system of equations using crammer's rule $x + 2y = 3$ $y - 3z = 4$ $3x - 2z = 5$	05	D15
179	Define symmetric matrix with illustration (2 times)	02	M15
180	Define singular and non-singular matrix with illustration (2 times)	02	M15
181	A=$\begin{bmatrix} 1 & 2 & 0 \\ -1 & 3 & -5 \\ 2 & 0 & 4 \end{bmatrix}$ then find $A^2 - 5A = 3I$	05	M15

182 If $A=\begin{bmatrix}1 & 0 & 7\\ 2 & 2 & 5\\ 0 & 3 & 6\end{bmatrix}$ then obtain $adj.A$ and A x $(adj.A)$ 05 M15

183 If $A=\begin{bmatrix}7 & 3 & 5\\ 0 & 3 & 2\\ 1 & 5 & 4\end{bmatrix}$, $B=-A$ and $C=-2B$ then find $2A+B+C$ (2 times) 05 M15

184 Solve the following system of equations using crammer's rule 05 M15

$$4x+10y=2xy$$
$$5x+16y=3xy$$

185 If $A=\begin{bmatrix}1 & 2 & 2\\ 1 & 2 & 2\\ 2 & 2 & 1\end{bmatrix}$ then find A^2-A+I 05 M15

186 Define inverse of a matrix 02 D14

187 If $A=\begin{bmatrix}1 & 2 & 1\\ 2 & 1 & 3\\ 2 & 1 & 4\end{bmatrix}$ then find A^2-A+I 05 D14

188 If $A=\begin{bmatrix}1 & 2 & 3\\ 1 & 1 & 2\\ 0 & 3 & 6\end{bmatrix}$ then obtain $adj.A$ and A x $(adj.A)$ 05 D14

189 If $A=\begin{bmatrix}1 & 2 & 2\\ 1 & 3 & -1\\ 2 & -1 & 1\end{bmatrix}$ then find A^2-2A+I 05 D14

190 What is the difference between Minor and co-factor 02 A14

191 If $A=\begin{bmatrix}1 & 4\\ -2 & -6\end{bmatrix}$ and $B=\begin{bmatrix}-1 & 1\\ 2 & 8\end{bmatrix}$ then find $2A-B+4I$ 02 A14

192 If $A=\begin{bmatrix}1 & 3 & -5\\ 2 & -2 & 0\\ 1 & 4 & 6\end{bmatrix}$ then find $|A|$ 02 A14

193 If $A=\begin{bmatrix}7 & 3 & 5\\ 0 & 4 & 2\\ 1 & 5 & 4\end{bmatrix}$, $B=3A$ and $C=-B$ then find $2A-B+C$ 05 A14

194 Prove that $\begin{vmatrix}Y+Z & Z+X & X+Y\\ X+Y & Y+Z & Z+X\\ Z+X & X+Y & Y+Z\end{vmatrix}=2\begin{vmatrix}X & Y & Z\\ Z & X & Y\\ Y & Z & X\end{vmatrix}$ 05 A14

195 Explain transpose of a matrix with illustration. If A is symmetric then A^T=____ 02 D13

196 $A=\begin{bmatrix}1 & 2 & 0\\ -1 & 3 & -5\\ 2 & 0 & 4\end{bmatrix}$ then find $A^2-5A+3I$ 05 D13

197 Find inverse of $A=\begin{bmatrix}2 & 3 & 1\\ 0 & 5 & 6\\ 1 & 1 & 2\end{bmatrix}$ (2 times) 05 D13

198 Solve the following system of equations using crammer's rule 05 D13

$$x+2y+3z-14=0$$
$$2x+y+z-7=0$$
$$5x+2y+z-12=0$$

199 If $A=\begin{bmatrix}1 & 4\\ -2 & -6\end{bmatrix}$ find matrix B such that $A+2B=A^2$ 05 D13

200 If $A=\begin{bmatrix}2 & 5 & 7\\ 2 & -1 & 0\\ 3 & 4 & 8\end{bmatrix}$, $B=\begin{bmatrix}1 & 4 & 9\\ 3 & -2 & 4\\ -5 & 6 & 8\end{bmatrix}$ then 05 D13

Prove that

i) $(A+B)^T = A^T + B^T$

ii) $(A \cdot B)^T = B^T \cdot A^T$

201 Define co-factor and Minor.(2 times) 02 A13

202 Without expansion prove that 05 A13

$$\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$$

203 Without expansion prove that 05 A13

$$\begin{vmatrix} x & x & x \\ x & y & y \\ x & y & z \end{vmatrix} = x(y-z)(x-y)$$

204 Solve the following system of equations using crammer's rule 05 A13

$$3x + 5y + 6z = 4$$
$$x + 2y + 3z = 2$$
$$2x + 4y + 5z = 3$$

205 If $A=\begin{bmatrix}1 & 2 & 1\\ 0 & 1 & -1\\ 3 & -1 & 1\end{bmatrix}$ then prove that $A^3 - 6A^2 - A + 9I = 0$ 05 A13

206 If $A=\begin{bmatrix}3 & 1\\ 2 & 4\end{bmatrix}$, $B=\begin{bmatrix}5 & 6 & 0\\ 0 & 1 & 2\end{bmatrix}$ then show that $(A \cdot B)^T = B^T \cdot A^T$ 05 A13

207 Define equal matrix with illustration 02 D12

208 Without expansion prove that 05 D12

$$\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0$$

209 Without expansion prove that 05 D12

$$\begin{vmatrix} 1 & x & yz \\ 1 & y & zx \\ 1 & z & xy \end{vmatrix} = (x-y)(y-z)(z-x)$$

210 If $A=\begin{bmatrix}2 & -1 & 0\\ 0 & 4 & 3\\ 2 & 1 & 5\end{bmatrix}$ and $B=\begin{bmatrix}4 & 1 & 3\\ 2 & 0 & 5\\ 1 & 3 & 0\end{bmatrix}$ then show that $(A \cdot B)^T = B^T \cdot A^T$ 05 D12

211 If $A=\begin{bmatrix}-1 & 3 & 5\\ 1 & -3 & 5\\ 1 & 3 & 5\end{bmatrix}$ and $B=\begin{bmatrix}2 & -3 & 3\\ -1 & 4 & 5\\ 1 & -3 & -4\end{bmatrix}$ then show that $B^2 - A^2 = (B+A)(B-A)$ 05 D12

212 Solve the following system of equations using crammer's rule (2 times) 05 D12

$$2x + 2y + z = 4$$
$$x + y + 2z = 1$$
$$3x + y + z = 2$$

213 If $A=\begin{bmatrix}1 & 2 & 2\\ 1 & 2 & 2\\ 2 & 2 & 1\end{bmatrix}$ then find the value of $A^2 - 2A + I$ 05 D12

214 If $A=\begin{bmatrix}3 & 1\\ 2 & 4\end{bmatrix}$ then find $adj.\,A$ 02 A12

215	Define transpose of a matrix with illustration	02	A12
216	If A=$\begin{bmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{bmatrix}$ then find the value of A^2	04	A12
217	If A=$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ and B=$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ then find AB and BA. Is $AB = BA$?	04	A12
218	Solve the following system of equations using crammer's rule $x + y + z = 3$, $x + 2y + 3z = 6$, $3x + y + 2z = 6$	04	A12
219	If A=$\begin{bmatrix} -4 & -3 & -3 \\ 1 & 0 & 1 \\ 4 & 4 & 3 \end{bmatrix}$ then show that $adj\ A = A^2$	04	A12
220	If A=$\begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}$ and B=$\begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}$ then verify that $(AB)^{-1} = B^{-1}A^{-1}$	04	A12
221	Solve the following system of equations using crammer's rule $3x - 2y + z = 2$, $x + 3y - 2z = 2$, $2x - y + z = 2$	04	A12
222	If $\begin{vmatrix} 11 & 40 & 28 \\ 3 & 12 & 8 \\ A & 2 & 2 \end{vmatrix} = 0$ then find the value of A.	02	D11
223	If A=$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ then find A^{-1}	02	D11
224	If A=$\begin{bmatrix} 4 & 1 & 3 \\ 2 & 0 & 5 \\ 1 & 3 & 0 \end{bmatrix}$, B=$\begin{bmatrix} 2 & -1 & 0 \\ 0 & 4 & 3 \\ 2 & 1 & 5 \end{bmatrix}$ then Prove that $(A + B)^T = A^T + B^T$	04	D11
225	If A=$\begin{bmatrix} 2 & 5 & 2 \\ 3 & 4 & 1 \end{bmatrix}$ and B=$\begin{bmatrix} 1 & 2 \\ 2 & 1 \\ 2 & 2 \end{bmatrix}$ then find AB and BA	04	D11
226	If A=$\begin{bmatrix} 1 & 2 & 0 \\ -1 & 3 & -5 \\ 2 & 0 & 4 \end{bmatrix}$ then find the value of $A^2 - 5A + I$	04	D11
227	If A=$\begin{bmatrix} 2 & -3 & 3 \\ -1 & 4 & 5 \\ 1 & -3 & -4 \end{bmatrix}$ and B=$\begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & 5 \\ 1 & 3 & 5 \end{bmatrix}$ then show that $A^2 - B^2 = (A + B)(A - B)$	04	D11
228	Without expansion prove that $\begin{vmatrix} a & 1 & b + c \\ b & 1 & c + a \\ c & 1 & a + b \end{vmatrix} = 0$	04	D11
229	'Every skew symmetric matrix is a diagonal matrix' true or false? Justify it	02	A11
230	If A=$\begin{bmatrix} a + b & 2 \\ 5 & ab \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$ then find a and b	02	A11
231	Prove that $\begin{vmatrix} -a^2 & ab & ac \\ ba & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} = 4a^2b^2c^2$	04	A11

232 If A=$\begin{bmatrix}7 & 3 & -5\\ 0 & 4 & 2\\ 1 & 5 & 4\end{bmatrix}$ and $B = 3A,\ C = -B$ then find $2A - B + C$ 04 A11

233 Find the inverse of the matrix A=$\begin{bmatrix}1 & 3 & 2\\ 1 & -4 & 4\\ 1 & 3 & -3\end{bmatrix}$ 04 A11

234 Show that $\begin{vmatrix}x & y & z\\ x^2 & y^2 & z^2\\ x^3 & y^3 & z^3\end{vmatrix} = xyz(x-y)(y-z)(z-x)$ 04 A11

235 Solve the following system of equations using crammer's rule 04 A11

$$2/x + 3/y + 10/z = 4$$

$$4/x - 6/y + 5/z = 1$$

$$6/x + 9/y - 20/z = 2$$

236 If A=$\begin{bmatrix}1 & -1\\ 2 & -1\end{bmatrix}$, B=$\begin{bmatrix}1 & a\\ 4 & b\end{bmatrix}$and $(A + B)^2 = A^2 + B^2$ then Find a, b 04 A11